

Claims

[c1] An apparatus for supplying oxygen-enriched gas to a patient and to a high pressure storage tank, comprising: a first compressor which receives ambient air; an oxygen concentrator which produces oxygen enriched gas, said oxygen concentrator having an inlet which receives air from said first compressor and an outlet which provides oxygen enriched gas to a product storage tank; a first outlet flow line which operatively delivers said oxygen enriched gas from said product tank to a patient, said flow line having a pressure from about 3 to about 10 psi; a second outlet flow line which operatively delivers said oxygen enriched gas from said product tank to a buffer tank at a pressure from about 12 to about 22 psi, said buffer tank operatively connected by a flow line to a radial compressor, said radial compressor being capable of compressing said oxygen enriched gas and transferring the oxygen enriched gas to a high pressure storage tank, and a prioritizing apparatus which terminates the operation of said radial compressor when the oxygen concentration of said oxygen enriched gas operatively delivered to said radial compressor falls below a predetermined value so that said oxygen enriched gas is continuously

supplied to the patient.

- [c2] An apparatus according to claim 1, wherein the amount of said oxygen in said patient flow line is at least 80% by volume.
- [c3] An apparatus according to claim 2, wherein said radial compressor includes at least two piston cylinder assemblies radially arranged around a crank shaft, and said piston cylinder assemblies adapted to sequentially compress said oxygen-enriched gas from said first piston assembly through said last piston assembly.
- [c4] An apparatus according to claim 3, wherein said prioritization includes a determination of said oxygen-enriched gas operatively delivered to said radial compressor by an oxygen sensor and the operation of said radial compressor being terminated when said sensed oxygen-enriched gas is below a predetermined oxygen level, and wherein said patient oxygen-enriched gas and said high pressure storage tank has an oxygen concentration of at least 90% by volume.
- [c5] An apparatus according to claim 4, wherein said radial compressor is operated by a power source other than said oxygen-enriched gas from said oxygen concentrator.

[c6] An apparatus for supplying oxygen-enriched gas to a patient and to a high pressure storage tank, comprising: a low pressure, oxygen-enriched gas patient flow line for use by a patient; a separate moderate pressure, oxygen-enriched gas buffer flow line operatively connected to a buffer tank; said moderate pressure being greater than said low pressure; said patient flow line and said buffer tank flow line being prioritized so as to continuously supply said oxygen-enriched gas for use by a patient; a radial compressor operated by a power source other than said oxygen enriched gas, said buffer tank solely and operatively connected to said radial compressor; said radial compressor being capable of compressing said oxygen-enriched gas to a high pressure; and a high pressure storage tank for portable storage of said high pressure oxygen-enriched gas.

[c7] An apparatus according to claim 6, wherein said radial compressor includes at least two piston cylinder assemblies radially arranged around a crank shaft, and said piston cylinder assemblies adapted to sequentially compress said oxygen-enriched gas from said first piston assembly through said last piston assembly.

[c8] An apparatus according to claim 7, wherein the amount of said oxygen in said patient flow line is at least 80% by

volume, and wherein said prioritization includes a determination of the oxygen-enriched gas operatively delivered to said radial compressor by an oxygen sensor and the operation of said radial compressor being terminated when said sensed oxygen-enriched gas is below a pre-determined oxygen level.

[c9] An apparatus according to claim 8, wherein said patient oxygen-enriched gas and said high pressure storage tank has an oxygen concentration of at least 90% by volume, and wherein said patient flow line has an oxygen-enriched gas flow rate of from about 1 to about 6 liters per minute.

[c10] An apparatus according to claim 9, wherein the pressure in said patient flow line is from about 3 to about 8 psi, wherein the pressure of said oxygen-enriched gas in said buffer flow line is from about 10 to about 22 psi, and wherein said high pressure storage tank is capable of storing said compressed oxygen-enriched gas at a pressure of from about 500 to about 4000 psi.

[c11] An apparatus according to claim 7, including an oxygen product storage tank and wherein said patient flow line and said buffer tank flow line are independently connected to said oxygen product storage tank.

- [c12] An apparatus according to claim 6, wherein said high pressure storage tank is portable.
- [c13] An apparatus according to claim 8, wherein said high pressure storage tank is portable.
- [c14] An apparatus according to claim 10, wherein said high pressure storage tank is portable.
- [c15] A process for supplying oxygen-enriched gas to a patient and to a high pressure storage tank, comprising the steps of: continuously supplying low pressure oxygen-enriched gas through a patient flow line; separately supplying a moderate pressure, oxygen-enriched gas through a buffer tank flow line to a buffer tank; said moderate pressure being greater than said low pressure; operatively supplying said oxygen-enriched gas from said buffer tank to a radial compressor; compressing said oxygen enriched gas in said radial compressor and feeding said compressed oxygen-enriched gas to a high pressure storage tank; and prioritizing said patient flow line and said buffer tank flow line so that said patient flow line is continuously supplied with said oxygen-enriched gas.
- [c16] A process according to claim 15, wherein the oxygen concentration in said patient flow line and said buffer

tank flow line is at least 75% by volume.

- [c17] A process according to claim 16, wherein the pressure of said oxygen-enriched gas in said storage tank is at least 500 psi, wherein said radial compressor includes at least two piston cylinder assemblies radially arranged around a crank shaft, and said piston cylinder assemblies adapted to sequentially compress said oxygen-enriched gas from said first piston assembly through said last piston assembly.
- [c18] A process according to claim 17, wherein the pressure of said oxygen-enriched gas in said patient flow line is from about 3 to about 10 psi and wherein the pressure of said oxygen-enriched gas in said buffer tank flow line is at a higher pressure.
- [c19] A process according to claim 18, wherein said prioritization includes shutting off said radial compressor when said oxygen-enriched gas thereto is below a predetermined level.
- [c20] A process according to claim 19, wherein the pressure of said oxygen-enriched gas in said high pressure storage tank is at least 1500 psi, and wherein the oxygen concentration in said patient flow line and said buffer tank flow line is at least 90% by volume.

- [c21] A process according to claim 15, wherein said high pressure storage tank is portable.
- [c22] A process according to claim 17, wherein said high pressure storage tank is portable.
- [c23] A process according to claim 18, wherein said high pressure storage tank is portable.
- [c24] A process according to claim 20, wherein said high pressure storage tank is portable.